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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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February 10, 2000

TO: Internal File

FROM: David Darby, Reclamation Specialist III, Project Lead

RE: Technical Analysis of the Pines Tract Significant Revision, Canyon Fuel Company LLC, SUFCO Mine, ACT/041/002 - SR99D-2

SUMMARY:

The Division received a significant revision to the SUFCO Mine Mining and Reclamation Plan on July 16, 1999. This revision is for the addition of Federal Leases UTU-76195, Pines Tract Lease (PTL). Division determined the proposal to be administratively incomplete on September 7, 1999. The permittee submitted additional information on October 18, 1999, and the Division determined the new information Administratively Complete and ready for technical review.

Submittal of the PTL follows the permitting of the Box Canyon Amendment, the 150 acre Amendment and the 160 acre Incidental Boundary Change. These mining areas lie west of the proposed Pines Tract Lease. Mining has already has taken place adjacent to Box Canyon and will advance through the 150 acre revision by the end of June, 2000. No surface facilities are planned other than a breakout in Muddy Creek Canyon for ventilation.

This lease addition has been under review by the U.S. Forest Service and the Bureau of Land Management (BLM) through the NEPA process resulting in development of the Pines Tract Project, Final Environmental Impact Statement (FEIS). On January 28, 1999, the Forest Service issued a Record of Decision (ROD) regarding this proposed action.

Several reports have been produced from studies conducted in the area. This Technical Analysis (TA) has drawn from all those known to have been developed. This Technical Memo is a hydrologic analysis of the proposed amendment incorporating information from the following reports.

- Pines Tract Project, Final Environmental Impact Statement, U.S. Forest Service and U.S

Bureau of Land Management (FEIS)

- Evaluation and Prediction of Potential Surface Subsidence Impacts from Longwall Mining under the Box Canyon Area, SUFCO Mine, Agapito Associates, Inc.(AGAPITO)
- Hydrology and Effects of Mining in the Quitchupah and Pines Coal-Lease Tracts, Central Utah, U.S.G.S. Report 90-4084, by Thiros & Cordy (USGS)
- Probable Impact From Longwall Coal Mining at the SUFCO Mine to the Hydrologic Balance of Box Canyon Creek, Sevier County, Utah (MAYO)

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR Sec. 783., et. al.

GENERAL

Regulatory Reference: 30 CFR Sec. 783.12; R645-301-411, -301-521, -301-721.

Analysis:

The PTL is located on the high Wasatch Plateau of the Manti-La Sal National Forest in Sanpete County. The surface rock forms near level outcrops that rims the area around to steep gorges of Box Canyon and Muddy Creek Canyon. At the 8000 to 9000 feet elevation the area usually receive several feet of snow. The hard sandstone cap rock reduces erosion so that the high mountain streams flow clear and product a high quality runoff. The clarity of flow changes as it cuts over the softer clays, muds and shales of the lower formations which form the canyon slopes and bottoms.

The massive Castlegate Sandstone forms the consolidated rim of Box Canyon and Muddy Creek Canyon. The coal bearing units are found in the Blackhawk Formation which underlies the Castlegate Sandstone. The Blackhawk Formation contains interbedded sequences of sandstones, siltstones, shales, mudstones and coal. The Upper Price River Formation overlies the area to the east of the canyon and some knolls of the proposed lease.

Findings:

The applicant has submitted sufficient information for this section.

PERMIT AREA

Regulatory Requirements: 30 CFR Sec. 783.12; R645-301-521.

Analysis:

Several plates, such as 7-3, Hydrologic Monitoring Stations, show the Pines Tract Lease (PTL) located northeast of the existing lease. The East Fork of Box Canyon extends approximately 1.25 miles onto the PTL.

The substantial and unique environment in Box Canyon has been well documented and includes springs, a perennial stream with pools, mosses and ferns. The riparian area along the stream is therefore designated as a crutial wildlife habitat. Detailed evaluation of the plant and animal considerations can be found in the respective Technical Analysis.

Findings:

The information provided in Volume 2 of the MRP, the PHC in Volume 10 and in the amendment sufficiently defines environmental setting.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.18; R645-301-724.

Analysis:

Climatological information is provided in Chapter 7, page 7-23. Data has been collected at the mine surface facilities since July 1996. Normal annual precipitation at the mine is about 18 inches per year.

Findings:

The applicant has submitted sufficient information for this section.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and analysis.

The applicant had conducted surface and groundwater monitoring surveys via Mayo Associates. Baseline hydrologic information is presented in Sections 7.2.4.1 and 7.2.4.2, and in the Probable Hydrologic Consequences Appendix 7-18.Water monitoring has been conducted on streams, springs, ponds and wells. The operator has presented the results in the Significant Revision (SR) submittal.

Baseline information.

Based on available scientific information and data collected by the applicant's consultants, the applicant has described the geologic and hydrologic setting on the PTL. Baseline information has been collected the identifies the premining features and characteristics of the site. Maps and cross-sections depict the geologic, hydrologic, mining and archeological resources. Literature and maps describe and identify stratigraphy, formation thickness, structural geologic features, mined areas, proposed mined areas, archeological sites, and surface structures.

Ground-water information.

The significant revision references the PHC included in the original MRP for a discussion of groundwater occurrence and recharge. There is general agreement among the studies that the recharge to the saturated zones is principally by snowmelt seeping into outcrops. Groundwater movement is controlled mainly by fractures, dip of the beds (dip is approximately 2 degrees to the northeast) and hydraulic conductivity of the strata. the movement of groundwater is regarded as relatively rapid (USGS). More seeps appear along the eastern edge of the walls consistent with the concept of groundwater following the dip slope.

Mayo and Associates have proposed a hydraulic disconnect between in-mine waters and near-surface groundwater. Mayo is considered a leading authority on isotopic dating of groundwater resources by some managing agencies and mining operators. Studies conducted by his firm have identified the groundwater regimes for several mining operations. Analysis of the groundwater for the PTL is substantiated by tritium analysis and carbon dating which shows the mine waters to be very old (greater that 7,000 to 20,000 years) as compared to meteoric waters that replenish the near surface waters (MAYO and FEIS). "The cause of this disconnect is

attributed to shale and mudstones in the Blackhawk Formation that hinder the downward migration of water" (FEIS). Mayo has concluded , "groundwater should not be diverted from the Castlegate Sandstone into the Blackhawk Formation" (FEIS).

Surface-water information.

Surface water sources are characterized in the MRP. The applicant has identified streams, springs and man-made ponds. Most of the stream flow is attributed runoff from snowmelt or rain. Spring flow contributes the most to the baseflow of the streams in later summer and fall months. Streams appear to be unquestionably perennial below the confluence of the tributaries. The low flows that emanate from spring in the upper reaches leave some to question if the streams are not intermittent. The term perennial functioning has been used by the U.S. Forest Service to describe the upper reaches of the East Fork of Box Canyon. The West Fork of the East Fork of Box Canyon is protected from subsidence, however mining has been not been prevented by the U.S. Forest Service on the East Fork of the East Fork.

Baseline cumulative impact area information.

The applicant discusses potential impacts in Chapter 7, Page 7-25. has identified the potential subsidence limits, Plate 5-10. Potential impacts are discussed in Appendix 7-18.

Modeling.

Using groundwater chemistry analysis, the recharge to the springs is believed to result primarily from flows in the Castlegate Sandstone as compared to the overlying Price River Formation. This appears to indicate that recharge to the springs in the Box Canyon tributaries is derived primarily from the area 1,000 feet of the canyon rims (FEIS) and (MAYO). Theoretically, decreased stresses along the canyons allows movement of the blocks in the fractured Castlegate Sandstone to widen creating more storage and conductivity of groundwater. Using Plate 5-2c, the escarpment boundary was used to draw a line 1000 feet in from the canyon rim. This revealed the area of potential recharge. A second chemical analysis suggests that the recharge locations for groundwater in the Casltegate Sandstone are different than the groundwater in the Blackhawk Formation, or that the groundwater recharged under different climatic conditions. This appears to be inconclusive.

Alternative water source information.

The applicant describes water resources and identifies the water rights in Appendix 7-1 and their locations on Plate 7-2. A plan to mitigate water resource impacts by alternative water source has not been identified.

Probable hydrologic consequences determination.

The probable hydrologic consequences are described in Appendix 7-18. There are two mechanisms where by ground and surface water can be adversely impacted, the direct interception of groundwater by opening mine workings and interception or rerouting of surface and groundwater by strata deformation.

Mayo addressed these issues on Pages 47 and 48, Appendix 7-18 he states that groundwater in the Blackhawk Formation is discontinuous and horizons of shales and mudstones and shales. Groundwater from three Blackhawk Formation springs (Pines 204, 206 and 303) were radiocarbon dated between 500 years to 4000 years. The ages of these waters are younger than the water encountered in the mine workings which yield dates between 7500 years to 20,000 years.

As mining progresses toward this area more information pertaining to impacts can be obtained. By extrapolating new information to similar areas on the PTL operational and reclamational predictions can be made. Mining of the upper reach of the West Fork of Box Canyon has revealed how subsidence fractures have developed when mining panels parallel and directly under a canyon. Mapping, measuring and analyzing these fractures over time can provide information on fracture healing, shallow groundwater interception and the effects of subsidence on local vegetation.

Findings:

The baseline information submitted by the applicant is sufficient to make a findings of existing conditions on the Pines Tract Lease.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Affected Area Boundary Maps

Several maps have been submitted, such as Plate 7-2, which show the topography, mine plan area, the proposed mine layout, structural features, hydrologic, archeological sites and

wildlife habitat. Plate 5-10 identifies the extent of expected subsidence. In recognition of the Record of Decision by the U.S. Forest Service the applicant have identified the West Fork of the East Fork of Box Canyon as a non-subsidence area.

Coal Resource and Geologic Information Maps

The applicant has provided maps and text (Chapter 6) identifying the geological resources, stratagraphic and structural features of the Pines Tract Lease area.

Existing Structures and Facilities Maps

Archeological sites, dirt roads, fences and runoff ponds and stock watering troughs are the only manmade structures that exist on the PTL (Plate 5-5). The ponds were developed as a watering source for livestock.

Existing Surface Configuration Maps

Several maps, including Plate 7-3, Hydrologic Monitoring, depict the surface configuration of the PTL.

Mine Workings Maps

Several maps, including Plate 5-7, Upper Hiawatha Mine Plan, 5 Year Projection, have been revised to show the mining sequence in the PTL. Plate 5-7 shows already shows the that operations are already advancing according to previous approved plans incorporated into the MRP on September 2, 1999 as associated with the 160 acre incidental boundary change.

Monitoring Sampling Location Maps

The applicant has supplied surface and groundwater monitoring location maps. Plate 7-3 identifies spring, stream and well monitoring locations. All sites are accompanied with an elevation identification.

Permit Area Boundary Maps

Several maps have been submitted, such as Plate 7-2, which show the topography, mine plan area, the proposed mine layout, structural features, hydrologic, archeological sites and wildlife habitat. Plate 5-10 identifies the extent of expected subsidence.

Surface and Subsurface Ownership Maps

The applicant has identified the surface and subsurface ownership on Plate 5-6. The surface is U. S. Forest Service managed land the subsurface is federal coal reserves.

Surface and Subsurface Water Resource Maps

Surface and groundwater rights are identified on Plate 7-2. Water has been allocated for stock ponds, springs and streams. The perennial flows in the west and East Forks of Box Canyon as well as the main channel are allocated. Water rights have also been issued on Muddy Creek a receiving stream of Box Canyon.

The applicant has provided a hydrologic monitoring stations map on Plate 7-3 of the SR. A hydrologic inventory map has not been supplied, which would provide a better concept of the extent of water resources.

Contour Maps

Several maps such as Plate 7-2 have incorporated contour intervals on the maps.

Findings:

R645-301-722.100, The applicant should provide a hydrologic inventory map of the PTL.

OPERATION PLAN

MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR Sec. 784.2, 784.11; R645-301-231, -301-526, -301-528.

Analysis:

General

The applicant has identified probable hydrologic consequences of mining the PTL, which are described in Appendix 7-18, Probable Hydrologic Consequences. The PHC was incorporated as part of the 160 acre Incidental Boundary Change. The geologic setting controls the flow

patterns and quality of surface and groundwater as they come in contact with the mineral constituents of the strata. The SR describes the Castlegate Sandstone which forms the rim and plateau of Box Canyon and Muddy Creek Canyon. The Blackhawk Formation, which contains the coal bearing units, underlies the Castlegate Sandstone. The Blackhawk Formation contains interbedded sequences of sandstones, siltstones, shales, mudstones and coal. The Upper Price River Formation overlies the area to the east of the canyon and some portions of the proposed lease. Several Plates submitted by the applicant show the topographic features of the area.

From past mining experience in areas adjacent to Box Canyon, it can be expected that fractures will develop at the surface, even when overburden height is as great as 800 feet. Recent, fractures along the canyon rim of the West Fork of Box Canyon and past mining under stock pond have shown that the natural joint pattern, which occurs in the area, can promote the effects of surface subsidence. The applicant has presented information that minimizes the effects of subsidence and fracturing. Fracture healing and groundwater flow patterns have been described, however conclusive evidence for fracture healing or mitigation has not been proven.

Information is still being collected and assembled from mining the West Fork of Box Canyon and the 150 acre incidental boundary change. Determination of impacts will not be concluded until the area is mined and hydrologic and subsidence data is analyzed.

The best method to obtain information for future impacts is to monitor impacted areas and try to extrapolate the information to future mine areas. Information is needed to determine if fractures close or heal, groundwater in the Castlegate Sandstone is reestablished after a time period, vegetation is sustained by long-term groundwater sources or by short term surface water sources.

Type and Method of Mining Operations

The applicant proposed to employ the room and pillar mining method in the PTL. Overburden ranges between 400 feet to a little over 900 feet. Areas where overburden is less than 600 feet will not be mined by the applicant. The U.S. Forest Service has stipulated in the Record of Decision (ROD) that areas under perennial streams will not be mined. In response the applicant has established barriers under perennial sections of the East Fork of Box Canyon which will protect the stream and adjacent areas of the canyon rim from subsidence.

Facilities and Structures

Mining is planned under most existing structures which include archeological sites, dirt roads, fences and runoff ponds and stock watering troughs. The applicant discussed potential impacts to surface structures and hydrologic sources and concluded that adverse impacts will not occur.

The U.S. Forest service has designated two archeological shelter and sites for protection against subsidence. One site, the Elusive Peacock is directly above a barrier established to protect a perennial stream and should not be impacted. The Refugia site is located near a barrier wall separating the PTL from the Quitchupah Lease. This site contains a perennial pond at the base of the cliff which is the supply source of riparian habitat in the vicinity and downstream of the shelter. The site appears to fall within the angle of draw of subsidence.

Some stock water monitoring ponds in the region have been impacted by surface fracturing when undermined, while others have not. Rock pond and Johnson Pond in the Quitchupah Lease leak as a result of undermining and subsidence. These ponds are supplied by ephemeral runoff. Grouting of the pond has been conducted, however after heavy rainstorms personnel from the USFS witnessed that the ponds were no holding water The applicant anticipates that eventually sediment will fill any fractures that have developed to drain the pond and their use will be restored. It is not possible to predict the extent or duration of impacts. The applicant has also proposed mitigation plans to repair any damage.

Findings:

Regulatory Perspective

The R645 regulations (R645-301-731) require that,

- "The plan will be specific to the local hydrologic conditions. It will contain the steps to be taken during coal mining and reclamation operations through bond release to minimize disturbance to the hydrologic balance within the permit and adjacent areas; to prevent material damage outside the permit area";

- "The plan will identify the surface water quantity and quality parameters to be monitored, sampling frequency and site locations. It will describe how these data may be used to determine the impacts of the operation upon the hydrologic balance":

- "The Division may require additional preventative, remedial or monitoring measures to assure that material damage to the hydrologic balance outside the permit area is prevented. Coal mining and reclamation operations that minimize water pollution and changes in flow will be used in preference to water treatment."

R645-301-525.244, The applicant should analyze the angle of draw of mining for the site and subsidence data from similar mining conditions (best in the same longwall panel) to determine if the public feature, Refugia, will fall within the influence of angle of draw and impact zone.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Ground-water monitoring.

Longwall mining is planned for the PTL. The panel alignment trends north-south. Subsidence of up to four feet is expected along the midline of the panels and subsidence cracks are expected to occur. AGAPITO estimates that fractures of 1 to 4 inches can occur in the canyons and fractures up to 2 feet can take place on the canyon rim where panels are parallel the canyon.

Several springs are located in the canyon and at its confluence with the West Fork of Box Canyon. There are also several springs in the main channel of Box Canyon, which eventually drain into Muddy Creek. The upper reaches of the East Fork of Box Canyon are what the U.S. Forest Service term a perennially functioning stream, Page 3-61, FEIS, Page 7 ROD. Carter Reed, U.S. Forest Service, Geologist defined the upper reaches as flows on the surface and in the alluvial system which contributes to the base flow of the down-stream system and supports riparian vegetation, Personal Communication, January 13, 2000. The canyons exhibit perennial flows near the confluence of the East Fork tributaries, shown on Figures 3, 7, 8 and 9 of the Pines Tract P.C., Appendix 7-18. The applicant proposes a groundwater monitoring program which includes springs and wells. The groundwater monitoring plan is identified in Table 7-2 of the SR.

An area has been identified during the review that has a potential being impacted during mining. The information presented by the applicant and research reports presents a scenario where subsidence fractures could develop along canyon rims, and in one canyon, the East Fork of the East Fork of Box Canyon, which is planned to be undermined. This canyon is also considered perennially functioning. The propagation of cracks may influence the flow pattern within the recharge zone (1000 feet in from the rim of the canyons) identified by Mayo. The seep and spring flow in this canyon is minor in comparison to the watershed, but significant to the riparian resource. It has been proposed that flows will be reestablish in time as the voids fill with groundwater or sediment to reach the original levels.

Surface-water monitoring.

The upper reaches of the tributaries contain springs of low flow which are perennial, but do not supply continuous flow to the stream channels. The upper reaches of the East Fork are shown be lined with riparian habitat in the PHC, Figure 3 and the FEIS, Figure 3-11. This area is identified as perennially functioning according the Page 7, of the Pines Tract Lease Record of Decision. Although identified as containing riparian habitat, the East Fork of the East Fork of Box Canyon does not have the same designation of protection as the West Fork of the East Fork of Box Canyon. The perennial springs in the upper reaches of the canyon do not sustain a constant or perennial flow in the channel. The USFS allows the development and longwall panels under the channel.

The applicant recommends monitoring seven stream locations in Table 5 of the P.C. These locations include Pines 106, Pines 108, Pines 403, Pines 405, 406, Pines 407 and Pines 408.

Acid and toxic-forming materials.

Information on acid and toxic forming materials is presented in Chapter 6 of the MRP and on page 53 of the P.C. Sulfide mineral pyrite has been identified in SUFCO Mine. Although pyrite oxidation does occur acid mine drainage does not. Alkalinity of mine drainage water typically exceeds acidity by a factor of 20. The applicant claims that no acid-forming materials or any toxic forming materials have been identified or are suspected to exist in materials disturbed in the Pines Tract Lease.

Discharges into an underground mine.

There are no planned discharges into underground mines for the PTL. Only on breakout is planned for the PTL which is down-dip in Muddy Creek Canyon.

Gravity discharges.

It is anticipated that in-mine water will be generated from mining the PTL. There are no gravity discharges currently planned from the PTL site. Intercepted groundwater will be used in the mining process and excess water will be pumped from the mine to the Quitchupah Creek UPDES mine discharge site. The mine is currently discharging approximately 1500 gallons per minute from the Quitchupah Lease into Quitchupah Creek.

Water quality standards and effluent limitations.

The mine plans to maintain water quality standards form disturbed areas and mine water discharges.

Stream buffer zones.

The applicant has implemented stream buffer along perennial reaches that have been designated perennial or have an overburden height of less than 600 feet.

Sediment control measures.

The applicant proposes to construct a breakout for mine ventilation. The disturbed will be small, approximately .01 acres. The area is very steep and no major hydrologic structures will be needed. The applicant plans to handle runoff control by placing silt fences below the disturbed area to trap and contain sediments.

Casing and sealing of wells.

The applicant has submitted plans in the approved MRP to case and seal all monitoring wells in accordance with their reclamation timetable.

Findings:

R645-301-731, The applicant shall develop an bi-annual operational monitoring plan to analyze the fractures that have taken place in the upper reaches of the West Fork of Box Canyon and extrapolate this information to the East Fork of Box Canyon. Information should also be collected over panels were canyons do not appear on the surface to check the difference in subsidence fracture patterns. The monitoring sites shall be identified, marked, mapped and the report shall identify fracture locations and extent, depth and width of fractures healing or spreading rates. Fractures should be plotted on a 1:24000 scale map. Monitoring sites should be established with the assistance of the DOGM hydrologist and U.S. Forest Service geologist.

R645-301-731, The applicant shall develop a monitoring plan to survey perennial flows in the channel of the East Fork of the East Fork of Box Canyon. This should be conducted on an annual basis during the months of September or October. The information will be used to determine the types of perennial flow that exist and any impacts. To date there is

conflicting information on the type of stream that exists in the upper reach.

R645-301-731, The flume in the main fork of Box Canyon below the already mined area and above monitoring point GW-20 should continue to be monitored. The stream becomes perennial at this point.

R645-301-731, Page 7-18, 1st paragraph- The text needs to be changed to add a description of the perennial reaches of Muddy Creeks. The perennial reaches need to be shown on Plate 7-3.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Affected area maps.

An affected area map showing the extent of subsidence which incorporates the angle of draw has been submitted.

Mining facilities maps.

The breakout area planned for the Muddy Creek drainage does not show detail for features, sediment control or topsoil storage.

Mine workings maps.

In a meeting with the BLM on January 22, 2000, Stan Perks mentioned that the new R2P2 showing the mine working has changed from the copy submitted with the SR. Mike Davis also mentioned changes in panel widths that are planned for the Pines Tract panels during a Link Canyon meeting on January 27, 2000.

Monitoring and sample location maps.

The applicant has submitted Plate 7-3 identifying the location of surface and groundwater monitoring locations.

Findings:

R645-301-521.100, The applicant shall submit cross-sectional design maps identify the characteristics and features of the breakout in Muddy Creek including slope, breakout height, elevation and distance to Muddy Creek.

R645-301-521.140, The applicant shall submit current mining map detailing the location of panels and their relationship to topographic features.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

The applicant has provided a reclamation plan in the MRP, page 7-48. Since only a the breakout is proposed for surface disturbance, surface reclamation of the PTL is relatively small. Any surface disturbance from subsidence or affects to the hydrologic system on the PTL would be covered in mitigation during the operation phase.

Findings:

The applicant has submitted sufficient information for this section

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Surface and Groundwater monitoring.

The applicant has identified a surface and ground water monitoring plan outlined in Tables 7-2 and 7-3. Additional sites have been requested to be monitored by the U. S. Forest Service. Although a monitoring plan has been established and the applicant should identify the period of monitoring which includes a time table when monitoring will cease.

Acid and toxic-forming materials.

Iron-sulfide is present in the mine capable of forming acids. The buffering capacity of carbonates in surrounding rock and continuous flow of groundwater flow prevent concentrated acid build-up.

Discharges into an underground mine.

The applicant plans no discharge of fluids or materials into the mine.

Gravity discharges.

The applicant describes the process for discharging intercepted groundwater. Currently all intercepted in the mine is discharged to Quitchupah Creek via a UPDES permit. The mine currently discharges approximately 1000 gpm or 2.25 cfs from the Quitchupah portal. As mining progresses into the PTL the intercepted groundwater will also be discharged to Quitchupah Creek. The Muddy Creek portal proposed in the mine plan is downdip of the mine. Sealing the portal will cause groundwater to back up behind the seals and could seep from the mine.

Sedimentation ponds.

There are no sediment ponds associated with the PTL.

Impoundments.

There are no impoundments associated with the PTL.

Casing and sealing of wells.

When no longer needed for monitoring or other use designated by UDOGM and upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well, each well will be capped, sealed, backfilled. Wells will be sealed and backfilled by placing a concrete plug from TD to surface.

Findings:

R645-301-731.521, Since the proposed breakout portal is down dip of the mine, and there is a high probability that groundwater will be intercepted into the mine after mining has ceased, the applicant should discuss how mine water discharge will be prevented.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

The surface disturbance should be limited to reclamation of the breakout area which covers an area of 0.01 acres.

Reclamation backfilling and grading maps.

Backfilling and sealing of the breakout portal is identified in the MRP as the standard method of sealing portals.

Findings:

The applicant has submitted sufficient information for this section.

RECOMMENDATIONS:

The SR is not recommended for approval until the deficiencies are addressed.

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